

CLAIMS:

1. An image analyzing method comprising the steps of spot-like dropping a specific binding substance onto a substrate to form a plurality of spots, photoelectrically detecting all of the thus formed spots to produce
5 template data, producing a template for defining regions of interest to be quantified based on the thus produced template data and effecting quantitative analysis based on the template.

2. An image analyzing method in accordance with Claim 1 which comprises the steps of spot-like dropping a fluorescent dye for producing
10 template data capable of being efficiently stimulated by a stimulating ray having a different wavelength from that of a stimulating ray capable of efficiently stimulating a fluorescent dye labeling a target substance derived from a living organism onto the substrate together with the specific binding substance to form a plurality of spots, irradiating the
15 plurality of spots with a stimulating ray having a wavelength capable of efficiently stimulating the fluorescent dye for producing template data, thereby stimulating the fluorescent dye for producing template data, photoelectrically detecting fluorescence emission released from the fluorescent dye for producing template data, producing the template data,
20 producing a template for defining regions of interest to be quantified based on the thus produced template data and effecting quantitative analysis based on the template.

3. An image analyzing method in accordance with Claim 2 which comprises the steps of spot-like dropping the fluorescent dye for
25 producing template data onto the substrate together with the specific binding substance to form the plurality of spots, hybridizing the substance derived from a living organism and labeled with a fluorescent dye with the specific binding substance, irradiating the plurality of spots

with a stimulating ray having a wavelength capable of efficiently stimulating the fluorescent dye for producing template data, thereby stimulating the fluorescent dye for producing template data, photoelectrically detecting fluorescence emission released from the fluorescent dye for producing template data, producing the template data, producing the template for defining regions of interest to be quantified based on the thus produced template data, irradiating the plurality of spots with a stimulating ray capable of efficiently stimulating the fluorescent dye to stimulate the fluorescent dye labeling the substance derived from a living organism, photoelectrically detecting fluorescence emission released from the fluorescent dye to produce image data, and effecting quantitative analysis based on the template.

4. An image analyzing method in accordance with Claim 2 which comprises the steps of spot-like dropping the fluorescent dye for producing template data onto the substrate together with the specific binding substance to form the plurality of spots, hybridizing the substance derived from a living organism and labeled with a fluorescent dye with the specific binding substance, irradiating the plurality of spots with a stimulating ray having a wavelength capable of efficiently stimulating the fluorescent dye labeling the substance derived from a living organism to stimulate the fluorescent dye, photoelectrically detecting fluorescence emission released from the fluorescent dye to produce image data, irradiating the plurality of spots with a stimulating ray having a wavelength capable of efficiently stimulating the fluorescent dye for producing template data, thereby stimulating the fluorescent dye for producing template data, photoelectrically detecting fluorescence emission released from the fluorescent dye for producing template data, producing a template data, producing a template for defining regions of

interest to be quantified based on the thus produced template data, and effecting quantitative analysis based on the template.

5. An image analyzing method in accordance with Claim 2 which comprises the steps of spot-like dropping the fluorescent dye for producing template data onto the substrate together with the specific binding substance to form the plurality of spots, irradiating the plurality of spots with a stimulating ray having a wavelength capable of efficiently stimulating the fluorescent dye for producing template data, thereby stimulating the fluorescent dye for producing template data, photoelectrically detecting fluorescence emission released from the fluorescent dye for producing template data, producing the template data, producing a template for defining regions of interest to be quantified based on the thus produced template data, hybridizing the substance derived from a living organism and labeled with a fluorescent dye with the specific binding substance forming the plurality of spots on the substrate, irradiating the plurality of spots with a stimulating ray having a wavelength capable of efficiently stimulating the fluorescent dye labeling the substance derived from a living organism to stimulate the fluorescent dye, photoelectrically detecting fluorescence emission released from the fluorescent dye to produce image data, defining regions of interest to be quantified in the image data based on the template and effecting quantitative analysis based on the template.

6. An image analyzing method in accordance with Claim 2 wherein the fluorescent dye for producing template data is contained in a polymer and which comprises the steps of causing the polymer to contain the specific binding substance, spot-like dropping the polymer onto the substrate to form a plurality of spots, irradiating the plurality of spots with a stimulating ray having a wavelength capable of efficiently

stimulating the fluorescent dye for producing template data, thereby
stimulating the fluorescent dye for producing template data,
photoelectrically detecting fluorescence emission released from the
fluorescent dye for producing template data, producing the template data,
5 producing the template for defining regions of interest to be quantified
based on the thus produced template data, and effecting quantitative
analysis based on the template.

7. An image analyzing method in accordance with Claim 6 wherein
the fluorescent dye for producing template data is contained in the
10 polymer and which comprises the steps of causing the polymer to contain
the specific binding substance, spot-like dropping the polymer onto the
substrate to form the plurality of spots, hybridizing the substance derived
from a living organism and labeled with a fluorescent dye with the
specific binding substance, irradiating the plurality of spots with a
15 stimulating ray having a wavelength capable of efficiently stimulating
the fluorescent dye for producing template data, thereby stimulating the
fluorescent dye for producing template data, photoelectrically detecting
fluorescence emission released from the fluorescent dye for producing
template data, producing the template data, producing a template for
20 defining regions of interest to be quantified based on the thus produced
template data, irradiating the plurality of spots with a stimulating ray
having a wavelength capable of efficiently stimulating the fluorescent dye
labeling the substance derived from a living organism to stimulate the
fluorescent dye, photoelectrically detecting fluorescence emission released
25 from the fluorescent dye to produce image data, and effecting quantitative
analysis based on the template.

8. An image analyzing method in accordance with Claim 6 wherein
the fluorescent dye for producing template data is contained in the

polymer and which comprises the steps of causing the polymer to contain the specific binding substance, spot-like dropping the polymer onto the substrate to form the plurality of spots, hybridizing the substance derived from a living organism and labeled with a fluorescent dye with the specific binding substance, irradiating the plurality of spots with a stimulating ray having a wavelength capable of efficiently stimulating the fluorescent dye labeling the substance derived from a living organism, thereby stimulating the fluorescent dye, photoelectrically detecting fluorescence emission released from the fluorescent dye to produce image data, irradiating the plurality of spots with a stimulating ray having a wavelength capable of efficiently stimulating the fluorescent dye for producing template data, thereby stimulating the fluorescent dye for producing template data, photoelectrically detecting fluorescence emission released from the fluorescent dye for producing template data, producing the template data, producing a template for defining regions of interest to be quantified based on the thus produced template data, and effecting quantitative analysis based on the template.

9. An image analyzing method in accordance with Claim 1 which comprises the steps of dropping a solution containing the fluorescent dye for producing template data onto the substrate using a spotter to form the plurality of spots, irradiating the plurality of spots with a stimulating ray having a wavelength capable of efficiently stimulating the fluorescent dye for producing template data, thereby stimulating the fluorescent dye for producing template data, photoelectrically detecting fluorescence emission released from the fluorescent dye for producing template data, producing the template data, producing a template for defining regions of interest to be quantified based on the thus produced template data, dropping a solution containing the specific binding substance using the

spotter onto another substrate to form a plurality of spots, hybridizing the substance derived from a living organism and labeled with a fluorescent dye with the specific binding substance, irradiating the plurality of spots with a stimulating ray having a wavelength capable of efficiently stimulating the fluorescent dye labeling the substance derived from a living organism, thereby stimulating the fluorescent dye, photoelectrically detecting fluorescence emission released from the fluorescent dye to produce image data, defining regions of interest to be quantified in the image data, and effecting quantitative analysis.

10 10. An image analyzing method in accordance with Claim 1 which comprises the steps of spot-like dropping the specific binding substance onto the substrate to form the plurality of spots, irradiating the plurality of spots with light, photoelectrically detecting light scattered by the plurality of spots to produce template data, and producing a template for defining regions of interest to be quantified based on the thus produced template data.

15 11. An image analyzing method in accordance with Claim 10 which comprises the steps of spot-like dropping the specific binding substance onto the substrate to form the plurality of spots, hybridizing the substance derived from a living organism and labeled with a fluorescent dye with the specific binding substance, irradiating the plurality of spots with a stimulating ray having a wavelength capable of efficiently stimulating the fluorescent dye, photoelectrically detecting light scattered by the plurality of spots to produce template data, producing a template for defining regions of interest to be quantified based on the thus produced template data, irradiating the plurality of spots with a stimulating ray having a wavelength capable of efficiently stimulating the fluorescent dye, thereby stimulating the fluorescent dye labeling the

substance derived from a living organism, photoelectrically detecting fluorescence emission released from the fluorescent dye to produce image data, defining regions of interest to be quantified in the image data based on the template, and effecting quantitative analysis.

5 12. An image analyzing method in accordance with Claim 10 which comprises the steps of spot-like dropping the specific binding substance onto the substrate to form the plurality of spots, hybridizing the substance derived from a living organism and labeled with a fluorescent dye with the specific binding substance, irradiating the plurality of spots
10 with a stimulating ray having a wavelength capable of efficiently stimulating the fluorescent dye, thereby stimulating the fluorescent dye, photoelectrically detecting fluorescence emission released from the fluorescent dye to produce image data, irradiating the plurality of spots with a stimulating ray having a wavelength capable of efficiently
15 stimulating the fluorescent dye, photoelectrically detecting light scattered by the plurality of spots to produce template data, producing a template for defining regions of interest to be quantified based on the thus produced template data, defining regions of interest to be quantified in the image data based on the template, and effecting quantitative
20 analysis.

13. An image analyzing apparatus comprising at least two stimulating ray sources, a light detector and an image reading apparatus for producing image data by photoelectrically detecting fluorescence emission by the light detector, the image analyzing apparatus further comprising
25 template producing means for producing a template based on template data produced by photoelectrically detecting by the light detector of the image reading apparatus all of the spots of a specific binding substance formed on a substrate by spot-like dropping the specific binding substance

and defining regions of interest to be quantified based on the template, and quantitative analyzing means for defining regions of interest to be quantified in the image data based on the template produced by the template producing means and effecting quantitative analysis.

5 14. An image analyzing apparatus in accordance with Claim 13 wherein the image reading apparatus is constituted so as to irradiate a plurality of spots formed by spot-like dropping a fluorescent dye for producing template data capable of being efficiently stimulated by a stimulating ray having a different wavelength from that of a stimulating
10 ray capable of efficiently stimulating a fluorescent dye labeling a target substance derived from a living organism onto the substrate together with the specific binding substance with a stimulating ray emitted from one of the at least two stimulating ray sources to stimulate the fluorescent dye and produce template data by photoelectrically detecting
15 fluorescence emission released from the fluorescent dye for producing template data by the light detector.

15 15. An image analyzing apparatus in accordance with Claim 14 wherein the image reading apparatus is constituted so as to irradiate a specimen obtained by spot-like dropping the fluorescent dye for producing
20 template data onto the substrate together with the specific binding substance to form the plurality of spots and hybridizing the substance derived from a living organism and labeled with a fluorescent dye with the specific binding substance with a stimulating ray having a wavelength capable of efficiently stimulating the fluorescent dye for
25 producing template data and emitted from one of the at least two stimulating ray sources to stimulate the fluorescent dye for producing template data, irradiate the fluorescent dye labeling the substance derived from a living organism with a stimulating ray having a

wavelength capable of efficiently stimulating the fluorescent dye and emitted from the other of the at least two stimulating ray sources to stimulate the fluorescent dye, produce template data by photoelectrically detecting fluorescence emission released from the fluorescent dye for
5 producing template data by the light detector, and produce image data by photoelectrically detecting fluorescence emission released from the fluorescent dye labeling the substance derived from a living organism, the template producing means is constituted so as to produce the template based on the template data, and the quantitative analyzing means is
10 constituted so as to effect template fitting between the template produced by the template producing means and the image data, thereby defining regions of interest in the image data and effecting quantitative analysis.

16. An image analyzing apparatus in accordance with Claim 14 wherein the image reading apparatus is constituted so as to irradiate a
15 specimen including a plurality of spots formed by spot-like dropping the fluorescent dye for producing template data onto the substrate together with the specific binding substance with a stimulating ray having a wavelength capable of efficiently stimulating the fluorescent dye for producing template data and emitted from one of the at least two
20 stimulating ray sources to stimulate the fluorescent dye for producing template data, produce template data by photoelectrically detecting fluorescence emission released from the fluorescent dye by the light detector, further irradiate a specimen obtained by hybridizing the substance derived from a living organism and labeled with a fluorescent
25 dye with the specific binding substance forming the plurality of spots on the substrate with a stimulating ray having a wavelength capable of efficiently stimulating the fluorescent dye and emitted from the other of the at least two stimulating ray sources to stimulate the fluorescent dye,

and produce image data by further photoelectrically detecting fluorescence emission released from the fluorescent dye labeling the substance derived from a living organism by the light detector, the template producing means is constituted so as to produce the template
5 based on the template data, and the quantitative analyzing means is constituted so as to effect template fitting between the template produced by the template producing means and the image data, thereby defining regions of interest in the image data and effecting quantitative analysis.

17. An image analyzing apparatus in accordance with Claim 14
10 wherein the image reading apparatus is constituted so as to irradiate a specimen including a plurality of spots formed by spot-like dropping a polymer containing the specific binding substance and the fluorescent dye for producing template data onto the substrate with a stimulating ray having a wavelength capable of efficiently stimulating the fluorescent dye
15 for producing template data and emitted from one of the at least two stimulating ray sources to stimulate the fluorescent dye for producing template data, and produce template data by photoelectrically detecting fluorescence emission released from the fluorescent dye for producing template data by the light detector.

18. An image analyzing apparatus in accordance with Claim 14 which
20 further comprises data storing means for storing data produced by the image reading apparatus and the image reading apparatus is constituted so as to irradiate a plurality of spots formed by spot-like dropping a solution containing a fluorescent dye for producing template data onto a
25 substrate using a spotter with a stimulating ray having a wavelength capable of efficiently stimulating the fluorescent dye for producing template data and emitted from one of the at least two stimulating ray sources to stimulate the fluorescent dye for producing template data,

photoelectrically detect fluorescence emission released from the fluorescent dye for producing template data by the light detector, thereby producing template data and storing them in the data storing means, irradiate a specimen including a plurality of spots formed by spot-like dropping a solution containing the specific binding substance onto another substrate using the spotter and hybridizing the substance derived from a living organism labeled with a fluorescent dye with the specific binding substance with a stimulating ray having a wavelength capable of efficiently stimulating the fluorescent dye and emitted from the other of the at least two stimulating ray sources to stimulate the fluorescent dye, photoelectrically detect fluorescence emission released from the fluorescent dye by the light detector, thereby producing image data, the template producing means is constituted so as to produce a template based on the template data stored in the data storing means, and the quantitative analyzing means is constituted so as to effect template fitting between the template produced by the template producing means and the image data, thereby defining regions of interest in the image data and effect quantitative analysis.

19. An image analyzing apparatus in accordance with Claim 13 wherein the image reading apparatus is constituted so as to irradiate a plurality of spots formed by spot-like dropping the specific binding substance onto the substrate with light and photoelectrically detect light scattered by the plurality of spots, thereby producing template data, the template producing means is constituted so as to produce a template based on the template data, and the quantitative analyzing means is constituted so as to define regions of interest to be quantified based on the template and effect quantitative analysis.

20. An image analyzing apparatus in accordance with Claim 19

wherein the image reading apparatus further comprises a filter detachably mounted on a front surface for cutting a light component of a wavelength of a stimulating ray and is constituted so as to irradiate, while the filter is detached, a specimen including a plurality of spots
5 formed by spot-like dropping the specific binding substance onto the substrate and hybridizing the substance derived from a living organism and labeled with a fluorescent dye with the specific binding substance with a stimulating ray having a wavelength capable of effectively stimulating the fluorescent dye, photoelectrically detect light of the
10 stimulating ray scattered by the plurality of spots by the light detector, thereby producing template data, and is also constituted so as to irradiate, while the filter is attached, the plurality of spots with a stimulating ray having a wavelength capable of effectively stimulating the fluorescent dye, thereby stimulating the fluorescent dye, photoelectrically detect
15 fluorescence emission released from the fluorescent dye, thereby producing image data by the light detector, the template data producing means is constituted so as to produce a template based on the template data, and the quantitative analyzing means is constituted so as to effect template fitting between the template and the image data, thereby
20 defining regions of interest to be quantified in the image data and effecting quantitative analysis.